Report of the 2018 Meeting of NOAA Fisheries' National Seabird Program

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Executive Summary

NOAA Fisheries' National Seabird Program (NSP) was created in response to Executive Order (EO) 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds) and the U.S. National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries. The NSP is a crosscutting group of managers and scientists who work domestically and internationally to protect and conserve seabirds as guided by statutes and emerging agency priorities. The NSP has two overarching goals: (1) mitigate bycatch and (2) promote seabirds as ecosystem indicators.

In 2018, the NSP convened a two-day meeting to: (1) revisit and refine the NSP mission and vision, and (2) draft a five-year NSP strategic plan. NSP representatives from every NOAA Fisheries science center, and regional and headquarters office, as well as invited participants from NOAA's National Ocean Service (NOS), the U.S. Fish and Wildlife Service (USFWS), Bureau of Ocean Energy Management (BOEM), and Regional Fishery Management Councils (RFMCs) were in attendance.

Prior to the meeting, a steering committee, with input from the broader NSP, developed five strategic initiatives that formed the framework for a draft strategic plan:

(1) monitor and estimate seabird bycatch;
(2) mitigate seabird bycatch;
(3) strengthen key partnerships;
(4) promote seabirds in advancing ecosystem-based fisheries management; and
(5) elevate awareness of and support for the National Seabird Program.

At the meeting, background presentations associated with each initiative were given, and working groups discussed revisions to the NSP mission statement and drafted goals and milestones associated with each strategic initiative.

The working groups were remarkably productive and significantly advanced the development of goals and milestones associated with their strategic initiative. This information was presented during the final hour of the meeting as the framework for NSP's five-year strategic plan.

The steering committee for the 2018 NOAA Fisheries' National Seabird Program Meeting, along with the broader NSP, will use the information obtained from this meeting to further develop its five-year strategic plan. The plan will follow calendar years, beginning in 2020 and ending in 2024. Our goal is to have the plan formalized, approved, and published as a NOAA Technical Memorandum by mid-to-late 2019.

Background - NOAA Fisheries' National Seabird Program

Executive Order 13186 (EO 13186), Responsibilities of Federal Agencies to Protect Migratory Birds, was enacted in 2001 to promote the conservation of migratory bird populations. As directed by this order, NOAA Fisheries and the USFWS formalized a Memorandum of Understanding (MOU) that placed special emphasis on minimizing the impact of fishery interactions on seabirds, and the maintenance of healthy habitats and forage fish for seabirds. Also in 2001, the U.S. finalized its National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries (NPOA-Seabirds), which directed NOAA Fisheries to work with Fishery Management Councils, USFWS, and U.S. Department of State to mitigate seabird bycatch domestically and internationally.

In 2001, former NOAA Fisheries Assistant Administrator William Hogarth created a National Seabird Coordinator position to maintain a national perspective through coordinated regional activities pertaining to EO 13186 and the National Plan of Action (NPOA) for Seabirds. Each science center and regional and headquarters office was directed to (1) review EO 13186 and send comments regarding the content of the MOU to be developed with USFWS that this EO directed; (2) review the NPOA-Seabirds and begin its implementation; and (3) designate one staff contact person from each science center to work with the Coordinator on seabird issues pertaining to these two directives. Milestones associated with these directives were also drafted.

The National Seabird Coordinator and regional points of contact (POC) were formalized into NOAA Fisheries' National Seabird Program (NSP) in a memo to former Assistant Administrator Eric Schwaab and former Chief Science Advisor for Fisheries Steven Murawski in 2011. That memo formalized the Coordinator's primary roles and responsibilities, transferred the NSP to the Office of Science and Technology (OST), and directed the Office of Sustainable Fisheries to continue to work with the NSP Coordinator on bycatch-related issues. The provided an overview of recommendations from the 2009 National Seabird Workshop (see below); these included creation of a National Seabird Strategic Plan and participation in the FY2013-2017 planning cycle with the intent of enhancing the NSP budget. The memo also summarized recommendations from the Science Board; these included emphasizing the importance of promoting seabirds as ecological indicators, maintaining the focus on seabird bycatch, and developing and implementing a National Seabird Strategic Plan.

A 2015 memo to former Assistant Administrator Eileen Sobeck, Deputy Assistant Administrator for Regulatory Programs Samuel Rauch III, and former Director of Scientific Programs and Chief Science Advisor Richard Merrick designated a new National Seabird Coordinator to succeed the previous coordinator, who had retired, clarified roles and responsibilities of that position and regional NSP POCs, and provided updates regarding the NSP.

Today, the NSP is a cross-cutting group of managers and scientists who work domestically and internationally to protect and conserve seabirds. NSP activities are guided by statutes and policies (e.g., NPOA-Seabirds, EO 13186, the Migratory Bird Treaty Act, Magnuson-Stevens Reauthorization Act, Endangered Species Act, National Environmental Policy Act, and Oil Pollution Act) and emerging agency priorities (e.g., Ecosystem-Based Fishery Management Policy and Road Map, the NOAA Fisheries Climate Science Strategy, Annual Guidance Memoranda). Together, these form the basis for NSP's two

overarching goals: (1) mitigate bycatch and (2) promote seabirds as ecosystem indicators. The NSP works through representation on steering committees and working groups within and external to NOAA Fisheries and through partnerships with other NOAA Line Offices, regional Fishery Management Councils, the States, and other Federal agencies. NSP is represented through POC in all science centers and regional and headquarters offices. As such, it is a nationally coordinated program that benefits from significant leveraging at the regional level.

The 2009 National Seabird Workshop

In September, 2009, NOAA Fisheries convened a National Seabird Workshop in Seattle, WA, at the Alaska Fisheries Science Center. This was the first in-person, comprehensive planning exercise for the NSP. The primary goal of the workshop was to initiate the development of a National Seabird Implementation Plan to (1) describe NOAA Fisheries' seabird activities and important partnerships, (2) guide NOAA Fisheries' seabird management science, and (3) provide seabird-related input to NOAA's strategic planning and budgeting process.

Individuals from all six NOAA Fisheries regions and a number of headquarters offices, plus invited participants from USFWS, the U.S. Geological Survey (USGS), the North Pacific Fishery Management Council, private consulting firms, universities, and private citizens attended. The first day was devoted to background presentations; the following two days were devoted to time for breakout groups to explore ideal regional strategies to address issues associated with each of four themes: (1) pelagic seabird abundance and distribution and overlap with fisheries; (2) anthropogenic impacts and mitigation; (3) management and coordination within and among agencies and with stakeholders on shared objectives; and (4) ecosystem approach to management – seabirds as indicators of marine health.

Six themes emerged as areas to be focused on in a 5-year timeframe: (1) continuing to work on seabird bycatch issues; (2) improving connections, networks, and outreach; (3) creating a multi-agency/entity inventory of spatial/temporal coverage of existing data and data collection methods; (4) using seabirds as indicators to improve ecosystem-based approaches to management; (5) formalizing the seabird program and adding necessary infrastructure; and (6) augmenting policy approaches.

Three major steps were identified to begin implementation of these priorities: (1) create a report of the workshop (subsequently published as Rivera et al. 2014); (2) create a National Seabird Strategic Plan; and (3) create alternatives for the fiscal year cycle of NOAA's strategic planning and budgeting process.

Subsequent to the workshop, the NSP and a steering committee developed a mission statement: "*Maintain seabirds as integral components of healthy and resilient ocean ecosystems by conducting research on and mitigating threats to seabirds in the ocean and near-shore environment, and by raising awareness of National Marine Fisheries Service seabird-related activities and responsibilities*" (Rivera et al. 2014). Six program goals were also identified:

(1) quantify, reduce, and mitigate impacts on seabirds due to fisheries;
(2) incorporate seabird ecology into NOAA Fisheries' ecosystem approach to management;

(3) raise awareness of NOAA Fisheries' seabird activities;
(4) develop, implement, and maintain a National Seabird Program strategic plan;
(5) support NOAA Fisheries' regional seabird activities through obtaining funding and other resources;
(6) facilitate communication among NOAA Fisheries' regional seabird programs to identify issues of common interest and opportunities for collaboration.

The 2018 Meeting of the National Seabird Program

In May of 2018, NSP convened a two-day meeting at NOAA Fisheries' Southwest Fisheries Science Center (SWFSC), in La Jolla, CA. This was the second in-person, comprehensive planning exercise for the NSP, and was focused on achieving two goals: (1) revisit and refine the NSP mission and vision; and (2) draft a five-year NSP strategic plan. NSP representatives from every NOAA Fisheries science center, and regional and headquarters office, as well as invited participants from NOS, USFWS, BOEM, and RFMCs were in attendance (46 attendees, Appendix 1).

For five months prior to the meeting, a steering committee (Ballance, Benaka, Ellgen, Fitzgerald, Henry, Kim, Nathanson) met biweekly to prepare. It was agreed that the NSP would maximally benefit from the face-to-face interactions among stakeholders if a framework for the strategic plan was already in place. Accordingly, five strategic initiatives were developed, some with draft goals, and these were put into a draft strategic plan (Appendix 2). The five strategic initiatives were:

(1) monitor and estimate seabird bycatch;
(2) mitigate seabird bycatch;
(3) strengthen key partnerships;
(4) promote seabirds in advancing ecosystem-based fisheries management; and
(5) elevate awareness of and support for the NSP.

These were based on existing areas of focus for the NSP, recommendations from the 2009 National Seabird Workshop, and existing and emerging agency priorities and strategies for fulfilling those. It was also agreed that the appropriate time frame for the strategic plan was five years, beginning in calendar year 2019. These ideas were discussed at the quarterly NSP call in April 2018, and subsequently agreed upon by the program.

The meeting agenda was designed to devote equal time to background presentations associated with each of the five strategic initiatives and for working groups to further develop the strategic plan and refine NSP's mission statement (Appendix 3). Specifically, the first day was devoted to opening remarks, and a general overview of the NSP and the draft strategic plan, followed by background talks pertaining to each strategic initiative (Appendix 4). The second day was largely a working day, during which time five working groups, each associated with a particular strategic initiative (Appendix 5), discussed revisions to the NSP mission statement and drafted goals (defined as an aim or desired result) and milestones for carrying out the strategic initiative (defined as an action or event marking a significant

change or stage in development). Working groups were also encouraged to link milestones with timelines and POC to the extent possible.

The working groups were remarkably productive during the short time allotted for their charge. Four of the five groups suggested revising the NSP mission statement, as follows:

- *Promote seabirds as integral components of healthy and resilient ocean ecosystems through research, monitoring, and mitigation of fishery interactions, and by raising awareness of NOAA Fisheries seabird-related activities and strengthening partnerships.* (Strategic Initiative 1 Working Group);
- *Work with partners to promote seabirds as integral components of healthy and resilient ocean ecosystems. Raise awareness of NOAA Fisheries seabird-related activities and responsibilities*. (Strategic Initiative 2 Working Group);
- *Promote and maintain seabirds as integral components of healthy and resilient marine ecosystems through science-based management and collaboration with partners*. (Strategic Initiative 3 Working Group); and
- *Maintain seabirds as integral components of healthy and resilient ocean ecosystems by conducting research on seabird biology and ecology, mitigating threats to seabirds and their environment, incorporating seabirds into ecosystem-based management, and raising awareness of NOAA Fisheries seabird-related activities and responsibilities* (Strategic Initiative 4 Working Group).

All five working groups significantly advanced development of goals and milestones associated with their strategic initiatives. These were compiled and presented during the final hour of the meeting as the basis for further development of NSP's five-year strategic plan.

Summaries of Working Group Discussions

The following are the results of each working group's discussion, which built upon the initial draft of the strategic plan and will be expanded as part of the process for completing NSP's five-year strategic plan. Timelines associated with milestone are as follows: short term = up to 6 months; medium term = 6 months to 1 year; long term = 1 year to life of strategic plan.

Strategic Initiative 1: Monitor and Estimate Seabird Bycatch

Fisheries bycatch is a threat to seabird populations worldwide. Monitoring fisheries bycatch and estimating its magnitude is a critical part of effective conservation and management. In particular, such monitoring allows for identification of emerging issues and challenges pertaining to fisheries interactions with seabirds. Critical pieces of monitoring include strong fisheries observer programs that include effective training, data standardization, and data management (i.e., documentation, quality assurance and quality control, and archiving). State-of-the-art analytical methods also are critical to

estimating bycatch. The NSP also recognizes the need to ensure consistency in monitoring and estimation, to the extent practicable, across regions for particular fishery types.

Goal 1: Engage with NOAA Fisheries observer programs to explore the standardization of data collection protocols and format, and ensure that seabird data are collected and effectively documented, communicated (internally and externally), integrated, quality checked, and archived

- Milestone: Conduct a review of the level and quality of seabird bycatch data collection, including how mortality is determined for live releases.
    - Timeline: short term
    - POC: NSP Coordinator with National Observer Program Advisory Team (NOPAT), Lee Benaka, and Jason Jannot
- Milestone: Convene a workshop (in-person or virtual) to discuss the results of the aforementioned review and identify minimum standards (including forms and standardized protocols) for seabird bycatch data collection.
    - Timeline: short term
    - POC: NSP Coordinator with NOPAT, Lee Benaka, Jason Jannot
- Milestone: Create a protocol for reporting bird tag data appropriately.
    - Timeline: short term
    - POC: NSP Coordinator with NOPAT, Lee Benaka, Joan Browder, and Jason Jannot
- Milestone: Establish a regular "virtual" series (annual or otherwise) of meetings via WebEx (or other video-conferencing software) of seabird data collection experts to discuss best practices and emerging issues related to seabird data collection.
    - Timeline: ongoing
    - POC: NSP Coordinator with NOPAT, Lee Benaka, and Jason Jannot
- Milestone: Work with observer programs to develop standardized protocols for collecting seabird data using electronic monitoring and other emerging technologies (e.g., electronic reporting, autonomous underwater vehicles).
    - Timeline: ongoing
    - POC: NSP Coordinator with NOPAT, Lee Benaka, Brett Alger, and Shannon Fitzgerald
- Milestone: Explore the development of data collection procedures (including tagging) to better capture seabird condition (e.g., reflex action mortality predictor analysis - RAMP) and nature of interaction (e.g., gear-specific) in order to inform post-release mortality data.
    - Timeline: long term
    - POC: NSP Coordinator with Office of Science and Technology (OST) - Mridula Srinivasan, Lee Benaka
- Milestone: Maintain current, and develop new, partnerships to maximize data collection from seabird bycatch carcasses, using the Pacific seabird necropsy program as a possible model.
    - Timeline: long term/ongoing
    - POC: NSP Coordinator with Shannon Fitzgerald

Goal 2: Ensure observers have training and skills to collect high-quality seabird data, including identification of lowest taxa practicable, utilization of safe-handling practices, and effective assessment of condition

- Milestone: Create an online clearing house that compiles seabird-related training resources for various observer programs.
    - Timeline: short term
    - POC: NSP Coordinator with NOPAT, and Lee Benaka
- Milestone: Convene a seabird training workshop(s) for post-deployment debriefers and trainers.
    - Timeline: mid term
    - POC: NSP Coordinator with NOPAT, and Lee Benaka
- Milestone: Establish best practices (e.g., photography, measuring tools) for observer seabird training based on the outcome of the previous two Milestones.
    - Timeline: long term
    - POC: NSP Coordinator with NOPAT, and Lee Benaka

Goal 3: Continually revise and develop new analytical approaches to estimate seabird bycatch

- Milestone: Convene a webinar with the U.S. Fish and Wildlife Service (USFWS) and other partners to determine how seabird population status is determined by the USFWS, and how bycatch estimates can best inform efforts to assess population status.
    - Timeline: short term
    - POC: NSP with leadership from NSP Coordinator
- Milestone: Convene a seabird bycatch estimation data workshop as part of, or in conjunction with, a Protected Species Assessment Workshop, to address topics including different types of unobserved seabird bycatch and bycatch in data-poor environments, discuss emerging issues related to seabird monitoring and analysis, and share approaches across regions.
    - Timeline: mid term
    - POC: NSP Coordinator with OST's Protected Species Science Branch Chief, Mridula Srinivasan
- Milestone: Encourage analytical approaches that incorporate bycatch drivers (i.e., fishery characteristics, biological assemblages, and environmental parameters) to better understand impacts to seabirds and associated species.
    - Timeline: ongoing
    - POC: NSP Coordinator with OST's Protected Species Science Branch Chief, Office of Protected Resources' (OPR) Marine Mammal Stock Assessment Coordinator

<u>Strategic Initiative 2: Mitigate Seabird Bycatch</u>

Goal 1: Conduct and support research on mitigating seabird bycatch

- Milestone: Ensure that Bycatch Reduction Engineering Program (BREP) and similar funding opportunities explicitly mention seabirds, and focus on the most pressing bycatch concern for seabirds. Consider using Council research priorities to help in this effort.

    - Timeline: BREP has an annual cycle, so when the call for proposals is under development, provide comments each year on the priorities
    - POC: NSP Coordinator with National Bycatch Coordinator/BREP, Office of Sustainable Fisheries (OSF)
- Milestone: Re-evaluate efficacy of mitigation methods through conducting a meta-analysis of published rates. (Published efficacy rates of individual methods may be dated, or apply only to individual projects/methods) – *note the overlap with Strategic Initiative 1*.
    - Timeline and POC to be developed
- Milestone: Publish technical reports on the extent to which third wire systems are necessary for trawl vessels on the west coast and Alaska (and possibly other regions).
    - Timeline: 1 year timeframe
    - POC: NSP Coordinator with Shannon Fitzgerald - AFSC Coordinated Seabird Studies Group lead, and relevant USFWS staff
- Milestone: Ensure that there is research on mitigation methods to reduce trawl-related seabird bycatch. (Note: research is currently being conducted on the west coast hake fleet.)
    - Timeline: 2-3 year timeframe
    - POC: NSP Coordinator with the Seabird/Trawl Interaction Working Group: Shannon Fitzgerald, Tom Good, and Jason Jannot
- Milestone: Conduct research to identify reasons for the increasing black-footed albatross bycatch.
    - Timeline: 1-2 year timeframe
    - POC: NSP Coordinator with seabird POC for each region and center; Western Pacific Fisheries Management Council (WPFMC)
- Milestone: Evaluate new mitigation tools and technology. (Note - WPFMC held a workshop Sept 18-19, 2018 to review existing measures such as blue-dyed bait vs side setting, etc., and alternative approaches.)
    - Timeline: to be developed
    - POC: to be developed
- Milestone: Develop and maintain expertise for vessel-based research on seabird bycatch mitigation.
    - Timeline: to be developed
    - POC: to be developed

Goal 2: Engage, where appropriate, with industry, Councils, and other management bodies (e.g., Commissions, Regional Fisheries Management Organizations (RFMOs), State and Federal Agencies) on seabird mitigation measures, from research through implementation (note the overlap with Strategic Initiative 3)

- Milestone: Work with Councils to identify management priorities for seabird mitigation.
    - Timeline: to be developed
    - POC: to be developed
- Milestone: Share mitigation improvements with RFMOs through scientific working groups. (Note that this is already occurring through the Inter-American Tropical Tuna Commission (IATTC).)
    - Timeline: to be developed

    - POC: to be developed

Goal 3: Conduct cooperative efforts with fishermen to encourage engagement with fisheries-based mitigation solutions

- Milestone: Develop vessel specific mitigation strategies (for vessels that are less effective at reducing bycatch).
    - Timeline: 3 years
    - POC: NSP Coordinator with AK Regional Office and seabird POC for each NOAA Fisheries science center
- Milestone: Educate fishermen in mitigation methods to ensure proper use of techniques.
    - Timeline: to be developed
    - POC: to be developed
- Milestone: Continue to develop outreach and education materials (e.g., safe handling and release of bycaught seabirds, current trends, regulations, seabird ID, and reporting).
    - Timeline: to be developed
    - POC: to be developed
- Milestone: Continue to ensure incidental take of seabirds in research and commercial fisheries is addressed through appropriate authorities and existing mechanisms.
    - Timeline: to be developed
    - POC: to be developed
- Milestone: Promote opportunities for collaborative seabird bycatch research, such as BREP or the Cooperative Research program, National Fish and Wildlife Foundation (NFWF).
    - Timeline: ongoing
    - POC: NSP Coordinator, others to be developed
- Milestone: Update the U.S. National Plan of Action (NPOA) for Reducing the Incidental Catch of Seabirds in Longline Fisheries (pending approval from NOAA Fisheries' leadership).
    - Timeline: to be developed
    - POC: NSP Coordinator with Office of International Affairs and Seafood Inspection, Mi Ae Kim
- Milestone: Ensure mitigation methods are being used appropriately. Once methods are part of regulation, ensure enforcement through cooperation with NOAA Fisheries Office of Law Enforcement (OLE), Coast Guard, others as necessary. (*This may fit better in Strategic initiative 1 and 3, as the idea came from having observers collect more and more consistent data on seabird mitigation measures that are being used (i.e. not just checking a box that streamer lines are being used, but are they meeting performance standards, etc.*) Crossover between enforcement and data collection.)
    - Timeline: to be developed
    - POC: to be developed

<u>Strategic Initiative 3: Strengthen Key Partnerships</u>

Goal 1: Strengthen partnerships with other federal agencies (e.g., USFWS, BOEM, USGS)

- Milestone: Renew the Memorandum of Understanding (MOU) between NOAA Fisheries and USFWS, per E.O. 13186 Responsibilities of Federal Agencies to Protect Migratory Birds (pending leadership approvals).
    - Timeline: to be developed
    - POC: NSP Coordinator
- Milestone: Establish regional USFWS POC for Endangered Species Act consultations.
    - Timeline: short term
    - POC: to be developed
- Milestone: Revisit/Establish (where necessary) regional USFWS POCs for National Environmental Policy Act (NEPA) assessments.
    - Timeline: short term
    - POC: NSP Coordinator with NOAA Office of General Counsel, Stacey Nathanson
- Milestone: Establish interagency seabird working group (NOAA Fisheries, USFWS, BOEM, USGS) to meet concurrently with annual meeting of the Pacific Seabird Group.
    - Look to previous MOUs for bulleted points outlining how these partnerships can be of benefit to each agency
        - Timeline: short term
        - POCs: NSP Coordinator with Roberta Swift/Scott Johnston (USFWS), and David Pereksta (BOEM)
    - Identify common needs/projects which can benefit from joint involvement (e.g., colony catalogues, seabird data groups)
        - Timeline: annually with PSG meetings (perhaps with pre-meeting calls)
        - POCs: NSP Coordinator with Dave Pereksta (BOEM), Liz Labunski/Scott Johnston/Roberta Swift (USFWS), and others to be identified
    - Produce annual reports of activities & accomplishments to brief agency leadership
        - Timeline: annually (post-PSG meetings?)
        - POCs: TBD

Goal 2: Strengthen partnerships with regional fisheries management councils

- Milestone: Identify Council-specific POCs for seabird issues.
    - Timeline: short term
    - POC: NSP Coordinator to reach out to Council Executive Directors/Deputy Directors who can identify appropriate POCs
- Milestone: Provide a written annual national report, with an offer to provide a summary in person, to all eight fishery management councils (FMCs) containing: seabird bycatch summaries, emerging issues (e.g., anticipated changes or additions to regulations, identification of fisheries with high seabird bycatch); report should contain information specific to particular regions.
    - Identify NOAA Fisheries POCs already working with FMCs on seabird issues
        - Timeline: to be developed
        - POC: NSP Coordinator with NOPAT and Bycatch Reduction Engineering Program (BREP), Lee Benaka, and Erin Wilkinson

    - Contact Council-specific seabird POCs for input on desired/helpful report content and timing
        - Timeline: to be developed
        - POC: to be developed
- Milestone: NSP request "MSA Research Priorities" (updates required every 5 years under the Magnuson-Stevens Act) document from each of the eight FMCs; NSP disseminate to regional seabird POCs.
    - Timeline: annually
    - POC: NSP Coordinator to request from NOAA Fisheries OST Director
- Milestone: Invite FMC representatives to NSP quarterly calls (as appropriate; annually if not more frequently).
    - Timeline: to be developed
    - POC: to be developed
- Milestone: Share national-level issues at Council Coordination Committee meetings, which are attended by all of the chairs, vice chairs, and executive directors from each FMC .
    - Timeline: meetings hosted by NOAA Fisheries are held in January or February of each year; meetings hosted by one of the Councils are in May or June
    - POC: NSP Coordinator

Goal 3: Strengthen partnerships with Regional Fisheries Management Organizations (RFMOs), multilateral agreements, and with other countries through bilateral relationships

- Milestone: Coordinate with U.S. delegations to RFMO meetings to advance seabird bycatch-related measures, such as increasing observer coverage of fisheries where seabirds have bycatch risk, improving collection of bycatch data, calling for analysis of bycatch data and implementation of mitigation measures, and enhancing mitigation measures where needed.
    - Timeline: ongoing, according to RFMO meeting schedules
    - POC: NSP Coordinator with International Affairs designate
- Milestone: Keep NSP updated on seabird bycatch and related activities within each of the RFMOs and in the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).
    - Timeline: ongoing, according to RFMO/CCAMLR meeting schedules
    - POC: NSP Coordinator with International Affairs designate
- Milestone: Continue partnership with the Agreement on the Conservation of Albatrosses and Petrels (ACAP) to advance exchange of information between NOAA Fisheries and other countries on seabird bycatch-related work and bring attention to/raise profile of the issue of seabird bycatch at RFMO meetings.
    - Timeline: ongoing, according to RFMO/ACAP meeting schedules
    - POC: NSP Coordinator with International Affairs designate
- Milestone: Suggest inclusion of seabirds on the agenda of bilateral fisheries policy dialogs, with Canada, Chile, Russia, Taiwan, others.
    - Timeline: ongoing, according to bilateral meeting schedules
    - POC: NSP Coordinator with International Affairs designate

- Milestone: Contribute to, and participate in, seabird conservation-related global workshops, international conferences, and other activities of this type when they involve seabird bycatch monitoring or mitigation.
    - Timeline: ongoing
    - POC: NSP Coordinator with International Affairs designate

Goal 4: Strengthen partnerships with other line offices within NOAA, Regional Fisheries Management Councils (RFMC), universities, and non-governmental organizations

- Milestones: To include Sanctuaries, National Ocean Service (NOS, POC Grace Bottittia), universities, SeaGrant, etc. Other potential partners include American Bird Conservancy, National Fish and Wildlife Foundation, Tribes. Consider identifying many key partners initially, and subsequently narrowing the scope to those that are strategic and able to leverage implementation of other activities of the strategic plan.
    - Timeline: ongoing
    - POC: to be developed

Goal 5: Clarify MSA's sections 316 (b) and (c) as they pertain to seabirds (cross-cutting with Strategic Initiatives 1 and 2)

- Milestones: to be developed.
    - Timeline: ongoing
    - POC: NSP Coordinator with NOAA Fisheries Office of General Council, and Stacey Nathanson

Strategic Initiative 4: Promote Seabirds in Advancing Ecosystem-Based Fisheries Management (EBFM)

With the NOAA Fisheries mission in mind, this initiative provided an overview of Ecosystem Based Fisheries Management/Ecosystem Based Management (EBFM/EBM) and provided clarity on how considering seabirds is important to that effort. Summaries of successfully incorporating seabird information into EBFM/EBM activities were provided. Discussions were held on the critical nature of seabird data and how NOAA Fisheries can play a role in collecting it and making it more accessible through internal processes or coordination with outside, sometimes global, database efforts.

The question often arises within NOAA Fisheries "Why Seabirds?" With our mission of ocean stewardship, the response is multi-faceted. Among other issues, we need to understand prey requirements of seabirds in large marine ecosystems; we need to understand the importance of direct and indirect top-down effects of seabirds and target fisheries; we need to make better use of seabirds as tools for sea-samplers and indirect indicators; and seabird "hotspots" must be accounted for in marine spatial planning.

Important datasets for seabirds include recurring at-sea surveys for abundance, distribution trends, and foraging hotspots, as well as colony monitoring, beached bird surveys, bycatch data, and necropsy data collected from bycaught birds (demographics, diet, ocean plastics ingestion, body condition). Many of

these datasets already exist and can be further developed to provide crucial long-term ecological context for implementing EBM/EBFM.

However, seabirds will not be used in EBFM/EBM until we are able to develop methodologies and strategic partnerships that will allow seabird data to be incorporated into management processes. With that in mind, the following goals and milestones were developed.

Goal 1: Foster better understanding of regional EBFM and RFMC processes by NSP members, in order to facilitate inclusion of seabirds in those processes

- Milestone: Regional NSP members identify (or self-identify) a seabird expert or someone familiar with regional seabird/science data to pursue other milestones in this initiative.
    - Timeline: short term
    - POC: to be developed
- Milestone: Establish contact (e.g., meeting) between Regional EBFM POC for regional science center, regional office, RFMC staff contact respectively (Table 1) and seabird data experts/NSP members.
    - Timeline: short term
    - POC: to be developed
- Milestone: Document RFMC staff or committee members that have seabird expertise. This will serve as a gap analysis and allow explorations of possible connections between seabird data and seabird-friendly RFMC members.
    - Timeline: short term
    - POC: to be developed

Goal 2: Improve understanding of the connections between existing seabird data and how they can be used to better inform/be meaningful to EBFM/EBM

- Milestone: Document where, how, when seabird data have been used in EBFM/EBM (this will likely be a living google spreadsheet).
    - Timeline: medium term
    - POC: to be developed
    - Bonus: turn this activity into a publication (medium term)
- Milestone: Establish communication between seabird data experts and ecosystem modelers/stock assessment scientists.
    - Timeline: medium term
    - POC: to be developed
- Milestone: Establish communication between Ecosystem Status Report leads and seabird experts/NSP members.
    - Timeline: medium term
    - POC: to be developed

Goal 3: Encourage seabird research that advances EBFM/EBM

- Milestone: Encourage analysis of seabird data that can advance EBFM/EBM (i.e., applied seabird research). This includes new indicators, Management Strategy Evaluation, and risk analysis.
    - Timeline: ongoing – medium to long term
    - POC: to be developed
- Milestone: Encourage the continued collection of seabird monitoring and data collection internal and external to NOAA.
    - Timeline: ongoing – medium to long term
    - POC: to be developed

EBFM POCs:

NOAA Fisheries	
SF Chair	Karen Abrams
S&T Vice Chair	Kenric Osgood
OHC	Kara Meckley
OPR	Kristy Long
NEFSC	Sean Lucey
SEFSC	Mandy Karnauskas
SWFSC	Toby Garfield
NWFSC	Chris Harvey
AFSC	Kerim Aydin
PIFSC	Beth Lumsden
GARFO	Mike Pentony (SFD)
SERO	Bill Arnold (SFD)
WCRO	Yvonne deReynier (SFD)
AKRO	Brandee Gerke
PIRO	Michelle McGregor (SFD)
HMS	Carrie Soltanoff
Regional Fishery Management Councils	
Gulf of Mexico	Morgan Kilgour
Mid-Atlantic	Brandon Muffley
New England	Chris Kellog
South Atlantic	Roger Pugliese
Pacific	Kit Dahl
North Pacific	Diana Evans
Western Pacific	Marlowe Sabater
Caribbean	TBD

Strategic Initiative 5: Elevate Awareness of and Support for the National Seabird Program

Goal 1: Continue to produce National Seabird Program (NSP) Annual Report; this report highlights NSP accomplishments

- Milestones: 1) Solicit Accomplishments from NSP members (every December); 2) prepare draft report for NSP member review (mid-January); 3) finalize report and submit to S&T for approval to distribute (due first week of February); 4) print glossy reports to have available for science centers and seabird meetings.
    - Timeline: annual
    - POC: NSP Coordinator

Goal 2: Prepare presentation detailing NSP 2018 Meeting at next Pacific Seabird Group Annual Meeting

- Milestones: prepare abstract, obtain approval by co-authors, submit to Pacific Seabird, prepare poster/oral presentation, attend and present.
    - Timeline: short term
    - POC: NSP Coordinator with interested NSP members

Goal 3: Present NSP research and management projects at annual Pacific Seabird Group meetings

- Milestones: 1) when providing seed-funding of NSP projects with NOP funds, identify project(s) that would be ideal to present at following Pacific Seabird Group Meeting (February-March); 2) when Annual Pacific Seabird Group Meeting is announced, remind projects that they are expected to submit abstract and present their project (July); 3) National Seabird Program presents at Pacific Seabird Group Annual Meeting (February following year).
    - Timeline: medium term
    - POC: NSP Coordinator

Goal 4: Present NSP emerging issues at NOAA Science and Brown Bag Seminars

- Milestones (timeline): 1) Evaluate NSP member quarterly presentations on seabird emerging issues NSP Meetings and seed-funded NSP projects using NOP funds for possible topics (Quarterly: Jan, Apr, Jul, & Oct); 2) request NSP members to present at NOAA seminar series as appropriate; 3) once scheduled, NSP Coordinator to announce to NSP team.
    - Timeline: medium term
    - POC: NSP Coordinator

Goal 5: Participate in World Migratory Bird Day and World Seabird Day to highlight NSP Accomplishments

- Milestones: 1) create World Seabird/Migratory Bird Day Steering Committee (early January); 2) Steering Committee to meet as needed to review NSP Annual Report for accomplishments to

highlight and how best to present (recommend collaboration with NOAA National Marine Sanctuaries); 3) Steering Committee to present plans to NSP Coordinator for approval and then finalize promotion plans (mid-April); 4) promote NSP Accomplishments on World Migratory Bird Day (second Saturday in May); 5) promote NSP Accomplishments on World Seabird Day (July 3rd).
    - Timeline: medium term
    - POC: NSP Coordinator

Goal 6: Produce NSP one-page handouts on NSP seabird conservation efforts for Fishery Management Council Meetings and seabird meetings

- Milestones: 1) create NSP Steering Conservation Committee to oversee drafting of one page handouts (early January); 2) steering Committee to meet annually to determine if new seabird conservation handout should be printed (recommendation to create hake fishery 3rd wire research handout); 3) prepare draft handout for NSP Coordinator approval; 4) print glossy type handout for distribution at Fishery Management Council meetings and seabird meetings.
    - Timeline: 2-3 year timeframe
    - POC: NSP Steering Conservation Committee Lead (recommend Shannon Fitzgerald, Tom Good, Jason Jannot)

Goal 7: Produce Data Gap Analysis every five years to determine what is not being done that should be done with seabirds

- Milestones: 1) establish NSP Seabird Data Analysis Steering Committee to meet biweekly for six months to evaluate seabird data collection and emerging issues (February – July 2020); 2) NSP Seabird Data Analysis Steering Committee to draft while paper for NSP Coordinator and team review (September 2020); 3) finalization of data analysis report which should include assessment of project (October 2020).
    - Timeline: long term
    - POC: NSP Coordinator and NSP Seabird Data Analysis Steering Committee Lead

Goal 8: Provide periodic briefings to the NOAA Fisheries' Assistant Administrator, Science and/or Regulatory Boards.

- Milestones: 1) briefings should be only when new/emerging issues or change in leadership occurs (evaluate annually); 2) if briefing should be undertaken, request time on agenda for presentation (as needed)
    - Timeline: long term
    - POC: NSP Coordinator

Goal 9: Include Seabirds in Science Center Activity Plans

- Milestones (timeline): 1) determine Science Centers with Activity Plans (early 2019); 2) science center NSP team member to work with NSP Coordinator to request seabirds be included in Center's Activity Plan; 3) revise annually as needed.
    - Timeline: short to medium term

- POC: NSP Coordinator with NSP team member from each science center

Goal 10: Maintain NSP Website

- Milestones (timeline): update NSP website when changes occur and notify NSP team via email of changes (as needed).
  - Timeline: ongoing
  - POC: NSP Coordinator

Next Steps

The Steering Committee for the 2018 NOAA Fisheries' National Seabird Program Meeting, along with the broader NSP, will use results from this meeting to further develop its five-year strategic plan. The plan will follow calendar years, beginning in 2020 and ending in 2024. Our goal is to have the plan formalized, approved, and published as a NOAA Technical Memorandum by mid- to late 2019.

Acknowledgements

We gratefully acknowledge NOAA Fisheries' Office of Science and Technology's National Observer Program for providing funding to support this meeting. We also acknowledge the many NOAA Fisheries regional and headquarters offices and science centers for their support of staff time and travel. Special thanks to the USFWS, the Western and North Pacific Fishery Management Councils, BOEM, and the National Ocean Service for supporting time and travel for staff to attend this meeting with a goal of strengthening partnerships. Finally, sincere thanks to Jenny McDaniel, Ravi Shiwmangal, and Gabriel Arce for flawless logistical support to make this meeting accessible remotely and productive for all.

Literature Cited

Rivera K. S., L. T. Ballance, L. Benaka, E. R. Breuer, S. G. Brooke, S. M. Fitzgerald, P. L. Hoffman, N. LeBoeuf, and G.T. Waring. 2014. Report of the National Marine Fisheries Service's National Seabird Workshop: Building a National Plan to Improve the State of Knowledge and Reduce Commercial Fisheries Impacts on Seabirds. September 9–11, 2009, Alaska Fisheries Science Center, Seattle, WA. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-F/SPO-139, 78 p.

Appendix 1. Attendees of the 2018 Meeting of NOAA Fisheries' National Seabird Program.

Name	Affiliation	Email address
Lisa Ballance	Southwest Fisheries Science Center	Lisa.Ballance@noaaa.gov
Lee Benaka	Office of Science and Technology	Lee.Benaka@noaa.gov
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Jefferson Hinke	Southwest Fisheries Science Center	Jefferson.Hinke@noaa.gov
Asuka Ishizaki	Western Pacific Fishery Management Council	Asuka.Ishizaki@wpcouncil.org
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Scott Johnston	US Fish and Wildlife Service	Scott_Johnston@fws.gov
Trevor Joyce	Southwest Fisheries Science Center	Trevor.Joyce@noaa.gov
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Elizabeth Labunski	US Fish and Wildlife Service	Elizabeth_Labunski@fws.gov
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Steve MacLean	North Pacific Fishery Management Council	Steve.Maclean@noaa.gov
Summer Martin	Pacific Islands Fisheries Science Center	Summer.Martin@noaa.gov
Stacey Nathanson	NOAA Office of the General Counsel	Stacey.Nathanson@noaa.gov
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Dave Pereksta	Bureau of Ocean Energy Management	David.Pereksta@boem.gov
John Peschon	Pacific Islands Regional Office	John.Peschon@noaa.gov
Robert Pitman	Southwest Fisheries Science Center	Robert.Pitman@Noaa.gov
Kevin Powers	National Marine Sanctuaries	KDPowers24@gmail.com
Jennifer Roberts	Alaska Regional Office	Jennifer.Roberts@noaa.gov
Joshua Rudolph	Pacific Islands Regional Office	Joshua.Rudolph@noaa.gov

Tammy Russell	Scripps Institution of Oceanography	TMRussell@ucsd.edu
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Gina Shield	Northeast Fisheries Science Center	Gina.Shield@noaa.gov
Ryan Silva	Greater Atlantic Regional Fisheries Office	Ryan.Silva@noaa.gov
Mridula Srinivasan	Office of Science and Technology	Mridula.Srinivasan@noaa.gov
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Laura Todd	US Fish and Wildlife Service	Laura_Todd@fws.gov
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Erin Wilkinson	Office of Sustainable Fisheries	Erin.Wilkinson@noaa.gov
Stephani Zador	Alaska Fisheries Science Center	Stephani.Zador@noaa.gov
Jen Zamon	Northwest Fisheries Science Center	Jen.Zamon@noaa.gov

Front row: Jeff Shenot, Harvey Walsh, Therese Conant, Jen Zamon, Stephani Zador, Erin Wilkinson, Liz Labunski, Asuka Ishizaki, Mridula Srinivasan, Mi Ae Kim, Tammy Russell. Middle row: Dave Pereksta, Scott Johnston, Jason Jannot, Tom Good, Jennifer Lee, Noelle Olsen, Lee Benaka, Kevin Powers, Robert Pitman, Rachael Wadsworth, Jenny McDaniel. Back Row: Lisa Ballance (NSP Coordinator), Ryan Silva, Laura Todd, Annette Henry, Roberta Swift, Steve MacLean, Rob Suryan, Shannon Fitzgerald, Summer Martin, and Trevor Joyce.

Appendix 2. Draft Strategic Plan presented at the 2018 Meeting of NOAA Fisheries' National Seabird Program.

National Seabird Program Five-Year Strategic Plan: 2019-2023

I. Background, History of the NSP, Areas of Focus & Accomplishments, 2009 Workshop, 2018 Meeting

II. NSP's Strategic Plan: 2019-2024

Strategic Initiative 1: Monitor and Estimate Seabird Bycatch

Background

Fisheries bycatch is a threat to seabird populations. Monitoring fisheries bycatch and estimating its magnitude is a critical part of effective conservation and management. In particular, such monitoring allows for identification of emerging issues/problems/challenges pertaining to fisheries interactions with seabirds. Critical pieces of monitoring include strong fisheries observer programs that include effective training, data standardization, and data management (documentation, QA/QC, archiving). Critical to estimating bycatch are state of the art analytical methods; consistency across regions for a particular fishery are also key.

Suggested Goals (each to include Description, Milestones/Timeline, Points of Contact); to be further developed during the meeting:

Continue to ensure high-quality seabird identification training for observers and enhance observer training where necessary

Engage with NOAA Fisheries' observer program coordinators to standardize data collection protocols and format, and to ensure that data are effectively documented, quality checked, and archived

Convene a data-sharing workshop focused on seabird bycatch data

Continually revise/develop new analytical approaches to estimate seabird bycatch, including unobserved seabird bycatch and bycatch in data-poor situations; share approaches across regions

Continue to support and enhance (where possible) the Pacific seabird bycatch necropsy program, and to create similar programs in other regions

Formalize a process to stay abreast of emerging issues – *Milestones to achieve this may include Ensure continued engagement with the National Observer Program Advisory Team, Bycatch Reduction Engineering Program, and other similar groups, both within and external to NOAA Fisheries.*

Strategic Initiative 2: Mitigate Bycatch

Background

Suggested Goals (each to include Description, Milestones/Timeline, Points of Contact); to be further developed during the meeting:

Conduct/Support research on mitigation methods (create fisheries-specific goals for trawls, pelagic longlines, and demersal longlines?) - *e.g., ensure that BREP and similar funding opportunities explicitly mention seabirds, use/support new technologies*

Continue to develop outreach materials for safe handling and release of bycaught seabirds

Conduct cooperative efforts with fishermen to encourage engagement with fisheries-based mitigation solutions - *mention BREP here and maybe Cooperative Research*

Update the U.S. National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries - *placeholder pending approval from NOAA Fisheries' leadership*

Strategic Initiative 3: Strengthen Key Partnerships

Background

To include partnerships within and external to the agency, so as to build on (not duplicate) effort and maximize impact

Goal i: Strengthen collaboration and coordination with USFWS

Description, Milestones/Timeline, Points of Contact

Milestones to consider:

- Renewal of MOU between NOAA Fisheries and USFWS per EO 13186 (pending approval of NOAA Fisheries leadership) – *key persons include Stacey Nathanson, Lesley Kordella*
- Maintain partnership with USFWS regarding ESA consultation for fisheries effects on seabirds for sharing USFWS seabird stock assessments and status information

Goal ii: Strengthen collaboration and coordination with Bureau of Ocean Energy Management

Description, Milestones/Timeline, Points of Contact to be further developed during the meeting

Goal iii: Strengthen collaboration and coordination with Regional Fisheries Management Organizations, and parties to bi- and multi-lateral agreements

Description, Milestones/Timeline, Points of Contact

Milestones to consider:

- Coordinate with U.S. delegations to RFMO meetings to advance seabird bycatch-related measures, such as increasing observer coverage of fisheries where seabirds have bycatch risk, improving collection of bycatch data, calling for analysis of bycatch data and implementation of mitigation measures, and enhancing mitigation measures where needed
- Keep NSP updated on seabird bycatch and related activities within each of the RFMOs and CCAMLR
- Continue partnership with ACAP to advance exchange of information between NOAA Fisheries and other countries on seabird bycatch-related work and bring attention to/raise profile of the issue of seabird bycatch at RFMO meetings
- Suggest inclusion of seabirds on the agenda of bilateral fisheries policy dialogs, with Canada, Chile, Russia, Taiwan, others
- Contribute to and participate in seabird conservation-related global workshops, international conferences, and other activities of this type when they involve seabird bycatch monitoring or mitigation

Goal iv: Strengthen collaboration and coordination with Fishery Management Councils

Description, Milestones/Timeline, Points of Contact to be further developed during the meeting

Goal v: Strengthen collaboration and coordination with National Ocean Service

Description, Milestones/Timeline, Points of Contact to be further developed during the meeting

Goal vi: Strengthen collaboration and coordination with NGO, Universities, SeaGrant, and other seabird-focused groups

Description, Milestones/Timeline, Points of Contact to be further developed during the meeting

Strategic Initiative 4: Promote Seabirds in Advancing Ecosystem-Based Fisheries Management and Ecosystem-Based Management

Background

To include an overview of EBFM; clarity on how considering seabirds is important to EBFM; summaries of existing successes with using seabirds in an EBFM context/for EBFM/Fisheries Management Plans; the

critical nature of seabird data and how NOAA Fisheries can play a role in collecting it and making it more accessible through internal processes and/or coordinating with existing global databases

Suggested Goals (each to include Description, Milestones/Timeline, Points of Contact); to be further developed during the meeting:

One or more goals should focus on next steps/how we advance this/what do we need/what are the gaps that prevent advancements/how can successes be applied to other areas

Standardize at-sea data collection protocols; & software; QA/QC, documentation, and archiving; regional or central repository

Create list of (or increase awareness of and access to) NOAA surveys & non-NOAA platforms of opportunity for at-sea seabird surveys, prioritize, and develop cost estimates for staffing

Develop metadata document of existing NOAA Fisheries seabird data *(e.g., what data do we have, what space and time extents, where and in what form are they stored)*

Develop strategic plan for consolidating and standardizing at-sea data *to include consideration of existing centralized databases such as the North Pacific Seabird Database, OBIS SEAMAP; discuss whether consolidation should be regional or national*

Strategic Initiative 5: Elevate Awareness of and Support for the National Seabird Program

Background

Suggested Goals (each to include Description, Milestones/Timeline, Points of Contact); to be further developed during the meeting:

Continue to produce National Seabird Program annual reports

Provide annual (periodic?) briefings to the AA, Science and Regulatory Boards

Continue to provide Program updates via presentations to NOAA Fisheries working groups and external scientific and management meetings

Maintain website

Appendix 3. Agenda for the 2018 Meeting of NOAA Fisheries' National Seabird Program.

WEDNESDAY, 30 MAY 2018 – PACIFIC ROOM		
8:20, 8:30, 8:40	Shuttle Pick-Up (Hotel La Jolla)	
8:30	Coffee, Mingle	
9:00	**Welcome, NOAA Fisheries' National Seabird Program, Meeting Goals, Introductions**	Lisa T. Ballance
9:30	**Five-Year Strategic Plan for NOAA Fisheries' National Seabird Program: Setting the Stage**	Lisa T. Ballance
10:00	**Strategic Initiative 1 - Monitor and Estimate Seabird Bycatch**	
	● NOAA Fisheries' National Observer Program & National Bycatch Report	Lee Benaka
	● Quantifying unobserved seabird bycatch	Tom Good
	● Estimating seabird bycatch in data-poor situations	Joan Browder (via WebEx)
10:45	Break	
11:00	**Strategic Initiative 2 – Mitigate Seabird Bycatch**	
	● NOAA Fisheries' Bycatch Reduction Engineering Program	Erin Wilkinson
	● National Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries	Mi Ae Kim
	● The M-Opinion	Lesley Kordella (via WebEx)
	● Mitigating Seabird Cable Strikes	Jason Jannot
	● Safe Handling and Release of Hooked/Entangled Seabirds	Sarah Ellgen
	● Streamer Line Distribution	Anne Marie Eich (via WebEx)
	● Lessons Learned from Short-tailed Albatross Recovery Efforts	Rob Suryan
12:45	Lunch	

13:15	**Strategic Initiative 3 – Strengthen Key Partnerships**	
	● USFWS - West Coast	Roberta Swift
	● USFWS - East Coast	Scott Johnston
	● USFWS - Alaska	Liz Labunski
	● USFWS - Coordination with Ecological Services & Listed Species -	Laura Todd
	● Bureau of Ocean Energy Management	Dave Pereksta
	● Regional Fisheries Management Organizations, Bilateral Fisheries Dialogs, and Global Fora	Mi Ae Kim
	● North Pacific Fishery Management Council	Steve MacLean
	● Western Pacific Fishery Management Council	Asuka Ishizaki
	● NOAA's National Ocean Service – Marine Sanctuaries	Kevin Powers
	● NGOs, Universities, SeaGrant	Shannon Fitzgerald
15:45	Break	
16:00	**Strategic Initiative 4 – Promote Seabirds in Advancing Ecosystem-Based Fisheries Management**	
	● EBFM 101	Toby Garfield
	● Seabirds as Indicators for Ecosystem-based Fisheries Management in the North Pacific	Stephani Zador
	● Seabirds as Indicators for Ecosystem-based Fisheries Management in the Southern Ocean	Jefferson Hinke
	● Seabird distribution and relative abundance in the central and eastern Pacific based on at-sea surveys, 1988-2017	Trevor Joyce
17:00	**Strategic Initiative 5 – Elevate Awareness of and Support for the National Seabird Program**	
	● Overview of Tools to Elevate Awareness and Support	Lisa T. Ballance

Happy Hour (18:00) & Dinner (19:00) – Martin Johnson House, Scripps Institution of Oceanography

As Needed	Shuttle Drop-Off (Hotel La Jolla)	

THURSDAY, 31 MAY 2018		
8:20, 8:30, 8:40	Shuttle Pick-Up (Hotel La Jolla)	
8:30	Coffee, Mingle – Pacific Room	
9:00	**Assignment to Working Groups**	Lisa T. Ballance
9:15	**Working Groups**	
	Strategic Initiative 1 – Monitor and Estimate Seabird Bycatch – Sardine Room *Lee Benaka, Jason Jannot, & Noelle Olsen (co-leads)*	
	Strategic Initiative 2 – Mitigate Seabird Bycatch – Adelie Room *Sarah Ellgen, Shannon Fitzgerald (AM only), Rob Suryan, Erin Wilkinson (co-leads)*	
	Strategic Initiative 3 – Strengthen Key Partnerships – Pacific Room *Lisa T. Ballance & Mi Ae Kim (co-leads)*	
	Strategic Initiative 4 – Promote Seabirds in Advancing Ecosystem-Based Fisheries Management and Ecosystem-Based Management – Stenella Room *Tom Good, Jefferson Hinke, Stephani Zador (co-leads)*	
12:00	Lunch	
13:00	**Working Groups Resume**	
	Strategic Initiative 1 – Monitor and Estimate Seabird Bycatch – Sardine Room *Lee Benaka, Jason Jannot, & Noelle Olsen (co-leads)*	

	Strategic Initiative 2 – Mitigate Seabird Bycatch – Adelie Room *Sarah Ellgen, Rob Suryan, Erin Wilkinson (co-leads)*	
	Strategic Initiative 3 – Strengthen Key Partnerships – Pacific Room *Lisa T. Ballance & Mi Ae Kim (co-leads)*	
	Strategic Initiative 4 – Promote Seabirds in Advancing Ecosystem-Based Fisheries Management and Ecosystem-Based Management – Stenella Room *Tom Good, Jefferson Hinke, Stephani Zador (co-leads)*	
	Strategic Initiative 5 – Elevate Awareness of and Support for the National Seabird Program – Albacore Room *Shannon Fitzgerald & Annette Henry (co-leads)*	
16:00	**Reconvene – Pacific Room; Reports by Strategic Initiative; Next Steps**	Lisa T. Ballance
17:00	**Adjourn**	
As Needed	Shuttle Drop-Off (Hotel La Jolla)	

FRIDAY, 1 JUNE 2018 (STEERING COMMITTEE ONLY)

8:30	Regroup, Writing Assignments, Adjourn

Appendix 4. Abstracts of talks presented at the 2018 Meeting of NOAA Fisheries' National Seabird Program.

Strategic Initiative 1: Monitor and Estimate Seabird Bycatch

NOAA Fisheries' National Observer Program & National Bycatch Report

Benaka, L.
Office of Science & Technology, NOAA Fisheries, Silver Spring, MD; Lee.Benaka@noaa.gov

NOAA Fisheries deploys fisheries observers on commercial fishing vessels. Fisheries observers are field biologists who collect fishing effort and biological data and samples from targeted fish species, discarded fish, and protected species interactions. Some fisheries observers also monitor vessel activity for compliance with fishing regulations. NOAA Fisheries administers observer programs in six different regions of the United States, with national coordination provided by the National Observer Program in Silver Spring, Maryland. Regional observer programs are responsible for sampling protocols and fishery coverage levels, safety training, observer deployment and debriefing, and data management and analysis. In 2016, NOAA Fisheries deployed 891 observers in 53 fisheries for a total of 73,743 sea days. From 2004 to 2018, the National Observer Program has spent an average of $139,000/year to fund National Seabird Program Projects, including:

- Seabird identification training for observers
- Seabird necropsy studies
- Enhanced monitoring of seabird interactions in the Northeast and Southeast United States
- Seabird distribution research in the Central Tropical Pacific and California Current
- Support of free streamer line distribution to Alaska fishermen
- Bycatch mitigation in the Pacific Coast groundfish fishery

NOAA Fisheries uses observer data, and other data sources, to publish fish bycatch and protected species interaction estimates through a variety of reports, including a series of U.S. National Bycatch Reports that began in 2011. The National Bycatch Reports compile bycatch estimates for fish and sea turtles, as well as interaction and take estimates for marine mammals and seabirds, for major U.S. fisheries. The most recent National Bycatch Reports have included a short national summary, regional summaries, and updated species-specific and fishery bycatch estimates for dozens of fisheries and hundreds of species. The next National Bycatch Report update, which will include bycatch estimates for 2014 and 2015, should publish in late 2018.

Quantifying unobserved seabird bycatch in the at-sea hake catcher-processor fishery

Thomas P. Good, Jason Jannot, Vanessa Tuttle
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Seabird mortalities caused by striking trawl warps or the data transponder cable (a.k.a. 3rd wire) have been recorded in at-sea hake fleets in both Alaska and the Southern Hemisphere. However, documenting the extent of the cable-strike issue in this fishery is a challenge, as overall duties of fisheries observers make their observations of seabird cable strikes extremely rare. Carcasses from these interactions are also rarely documented, as injured or dead birds may move or float away from the vessel, and they rarely end up in the net or on a cable and recorded. Thus, despite 100% observer coverage, interactions between seabirds and trawl cables, and any resultant bycatch, are likely underestimated for at-sea hake catcher-processor vessels. In 2016 and 2017, in an effort to inform bycatch estimation and potential mitigation strategies, observers quantified seabird-cable interactions on at-sea hake catcher-processor vessels during 15-minute sessions on randomly selected daytime

hauls. Over 952 observation sessions, they recorded 346 strikes, 81 of which were “hard" strikes having the potential to cause mortality. For black-footed albatross, the fleet-wide expansion for hard strikes was estimated to be 495 (61 – 994 95% CL), which, using a 12% mortality rate, may have resulted in 59 mortalities (8 – 118 95% CL). By contrast, fisheries observers documented only two mortalities in this fleet during the two-year study, highlighting the mismatch between observed and potential mortality. Follow-up studies will systematically quantify seabird cable strikes, attempt fate assessment after seabird-cable interactions, and examine factors that may be influencing cable-strike probabilities (*e.g.*, bird density, offal plume presence, wind speed and direction, vessel activity, etc.). Results will also parameterize model-based estimation of cable strike mortality, which will inform annual bycatch estimation as well as collaborative work with industry to mitigate seabird bycatch resulting from cable strikes in this fishery.

Evolution of methodology to estimate seabird bycatch in the US Atlantic pelagic longline fleet

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Since 2010, seabird bycatch statistics for the US pelagic longline fishery (PLL) in the Western North Atlantic (WNA) have been prepared at Virginia Tech under the direction of Dr. Yan Jiao as part of the Seabird Bycatch Project of the Southeast Fisheries Science Center. Specific analytical approaches and statistical model constructs have evolved over time to address the characteristics of the WNA PLL observer program (POP) seabird bycatch database, which, combined with effort, contains many zeros, positive records with many ones, and a high proportion of seabird records unidentified to species. Starting from the traditional delta lognormal model, the following innovations have been introduced: 1) replacement of fixed-year-effect with random-year-effect in a transition to mixed-effect models; 2) development of hurdle models in which excess ones are represented with a k-aggregated zero-truncated Conway-Maxwell-Poisson distribution; and (3) Bayesian group-specific multi-species bycatch estimation based on species grouped by common physical and behavioral characteristics and informed by seabird composition data from a US Geological Survey (USGS) compendium of at-sea surveys. Random-year-effect models are more statistically efficient than fixed-year-effect models. Both simulation studies and analysis of real data indicated that random effect models increased model goodness of fit and reduced prediction uncertainty, as indicated by lower Akaike’s Information Criterion (AIC) and mean-square-error. Fitting a k-aggregated hurdle model to positive data with a high proportion of singletons reduced model bias and improved estimation accuracy, which was proved through both the WNA seabird bycatch data and a set of simulation studies. Bayesian models of species grouped by commonalities of characteristics such as size and feeding behavior enabled predictions for individual species or groups of species. The model construction provided a framework to accomplish objectives of developing capability to estimate fleet bycatch by species and predicting bycatch of rare species foraging in the PLL fleet footprint but seldom observed and never observed in bycatch.

Strategic Initiative 2: Mitigate Seabird Bycatch

NOAA Fisheries’ Bycatch Reduction Engineering Program

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The Bycatch Reduction Engineering Program (BREP) is a grant program that supports the development of technological solutions and changes in fishing practices designed to minimize bycatch. Our mission is

to find creative approaches and strategies for reducing bycatch, seabird interactions, and post-release mortality in federally managed fisheries. Each year, we receive approximately $2.5 million to support external research projects. The program is run out of the Office of Sustainable Fisheries and we have representatives from each Region, Center and Headquarters office on our technical committee. As BREP is an external grant program, there is a completive process where interested individuals or organizations apply for funding through the annual federal funding opportunity. BREP has had four priorities for the past few years including: developing innovative and effective technologies, improving understanding and reduction of post-release mortality, developing techniques to reduce interactions between fishing gear and corals, sponges and other structure- forming invertebrate, and supporting international bycatch reduction projects. Projects looking at seabird bycatch currently fit within our innovative and effective technologies priority. While BREP does not receive a large number of applications focused on seabird bycatch reduction research, the program has funded seabird projects in the past, including one in 2017.

U.S. National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries

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The Food and Agriculture Organization of the United Nations (FAO) Committee on Fisheries adopted the *International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries* (IPOA-Seabirds) at its 1999 meeting. The IPOA is a voluntary instrument that calls on countries to assess the degree of seabird bycatch in their longline fisheries and, in those fisheries where a seabird bycatch problem exists, to develop National Plans of Action (NPOA) to reduce the bycatch. The United States fulfilled this call by issuing the *U.S. National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries* (NPOA-Seabirds) in 2001. NPOA-Seabirds, developed collaboratively by NOAA Fisheries, U.S. Fish and Wildlife Service, and Department of State, provides national-level policy guidance on reducing seabird bycatch. The guidance has NOAA Fisheries, in cooperation with FWS, conduct an assessment of all U.S. longline fisheries to determine whether a seabird bycatch problem exists and, working through the regional fishery management council process, to develop and implement seabird bycatch mitigation measures in fisheries that have a bycatch problem. NPOA-Seabirds also calls for continuing with international collaboration on seabird bycatch issues. Since issuance of the U.S. NPOA-Seabirds, much progress has been made with respect to seabird bycatch. Some of the progress is summarized in the 2014 report of NPOA-Seabirds implementation, such as regulations to mitigate seabird bycatch in Alaskan, Western Pacific, and West Coast fisheries, adoption of binding conservation and management measures for seabird bycatch by regional fisheries management organizations, and multiple outreach and educational tools for fishermen about seabird bycatch. In addition, FAO published in 2009 best practice technical guidelines to reduce incidental catch of seabirds in fisheries, because few NPOAs had been adopted and the content and quality of existing NPOAs varied widely. The guidelines are designed to assist States in assessing the need for or drafting a new NPOA-Seabirds or reviewing their current NPOA-Seabirds and assist Regional Fisheries Management Organizations (RFMOs) in developing regional action plans. If efforts are undertaken to update the U.S. NPOA-Seabirds, these guidelines should be considered.

Summary and Update of M-Opinion 37050 published by the U.S. Department of Interior

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The publication of M-Opinion 37050 by the U.S. Department of Interior on December 22, 2017, raised many questions from federal agencies, including NOAA Fisheries, regarding the implementation of the Migratory Bird Treaty Act (MBTA). The new interpretation of the MBTA requires changes to policy and practice across U.S. Fish and Wildlife Service (Service) programs. This Service first provided guidance to Service staff to clarify what constitutes intentional take, what actions that must be taken when conducting intentional take (e.g., obtain a permit via 50 C.F.R. Part 21), and what changes to prior practice should be made in light of the M-Opinion. The M-Opinion concludes that the take of birds resulting from an activity is not prohibited by the MBTA when the underlying purpose of that activity is not to take birds. The Service interprets the M-Opinion to mean that the MBTA's prohibitions on take apply when the intent of an action is to take migratory birds, their eggs, or their nests, and it results in the take of such birds, eggs or nests. Conversely, the Service interprets that the take of birds, eggs or nests occurring as the result of an activity, the intent of which is not to take birds, eggs or nests, is not prohibited by the MBTA. The Service will work closely with NOAA Fisheries to examine and update the current Memorandum of Understanding developed under Executive Order 13186 for relevant or necessary changes regarding seabird bycatch and best management practices in order to meet conservation needs for seabird species.

U.S. West Coast and Alaska Trawl Fisheries Seabird Cable Strike Mitigation Workshop

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The U.S. West Coast and Alaska Trawl Fisheries Seabird Cable Strike Mitigation Workshop was held on 7–8 November 2017 at the NOAA Fisheries West Coast Region in Seattle, Washington. The workshop was hosted by staff from NOAA's Northwest Fisheries Science Center, Alaska Fisheries Center, and the Alaska Regional Office. Thirty-nine workshop attendees from Alaska, Washington, and Oregon, representing the U.S. West Coast and Alaskan groundfish trawl fishing industry, seafood associations, non-governmental organizations, and federal agencies participated in the 1.5-day workshop. The workshop included presentations from subject-matter experts on the scope and scale of the seabird cable strikes, as well as mitigation strategies utilized in global fisheries. Breakout groups discussed mitigation strategies and designs to reduce seabird cable strikes, prioritized mitigation strategies, and discussed potential challenges to implementation as well as next steps for the priority mitigation measures. Workshop participants agreed to test five mitigation measures:

1. Snatch block
2. Water deterrents
3. Improved visibility cables
4. Streamer lines and warp booms
5. Third wire float device

Many other methods were discussed but were determined to either be unfeasible or are already being employed. The participants agreed that current research should continue and be refined. Participants should partner to improve data collection, and begin testing and development of mitigation strategies. Dedicated seabird observers are needed to increase the quality of the data. Participants agreed to be proactive and stay engaged in this long-term, deliberative, collaborative process. Fishing companies

pledged to engage their fleets. Early reports from 2018 fishing season in Alaska indicate that some vessels have voluntarily adopted measures from the workshop. A NOAA Technical Memorandum of the workshop process and outcomes, including links to documents and other resources, has been published and made available to workshop participants and the public.

Safe Handling and Release of Hooked/Entangled Seabirds

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The Hawaii deep-set longline tuna fishery and the Hawaii shallow-set longline swordfish fishery interact primarily with Laysan albatross and black-footed albatross in the North Pacific. These species are large birds with a large wingspan that can make handling and hook removal challenging. Federal regulations governing the Hawaii longline fisheries require seabird avoidance and defined handling and release techniques. These requirements, implemented in the early 2000s, have greatly reduced seabird bycatch in both fisheries. Ms. Ellgen presented two outreach materials developed by the Pacific Island Regional Office (PIRO) with the support of the National Seabird Program. The illustrated instructional guide and eight-minute video include best practices and regulatory requirements for fishermen when retrieving, handling, de-hooking, and releasing seabirds, including endangered short-tailed albatrosses. https://www.st.nmfs.noaa.gov/Assets/nationalseabirdprogram/PIRO.SeabirdHandlingGuidelines.pdf. Please contact PIRO for more information about these resources.

Streamer Line Distribution

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Seabirds are attracted to longline vessels discarding offal. Seabirds are most vulnerable to gear interactions during gear deployment when they actively attempt to eat bait from hooks at the surface. To minimize bycatch in waters off Alaska, longline vessels use seabird avoidance measures, most commonly in the form of streamer lines (also known as tori lines or bird scaring lines). Streamer lines dramatically reduced seabird bycatch when they were introduced starting in 2002, as a result of a collaborative process whereby Washington Sea Grant led field studies supported by NOAA, U.S. Fish and Wildlife Service, and fishing industry associations. Since 2004, seabird avoidance measures have been required for operators of vessels > 26 ft length overall using longline gear fishing for Individual Fishing Quota (IFQ) halibut, Community Development Quota halibut, or IFQ sablefish in the exclusive economic zone (EEZ) off Alaska or State of Alaska waters (0 to 200 nm combined); or groundfish in the EEZ off Alaska (3 to 200 nm). Outreach to the fleet reiterating the importance of streamer lines in reducing seabird bycatch is important. Through two National Seabird Program grants (2016 and 2018), the Alaska Region has been able to purchase and provide for free a limited number of streamer lines to federal fishermen. The streamer lines are available at many NOAA Fisheries Office of Law Enforcement offices throughout Alaska.

Lessons learned from short-tailed albatross recovery efforts

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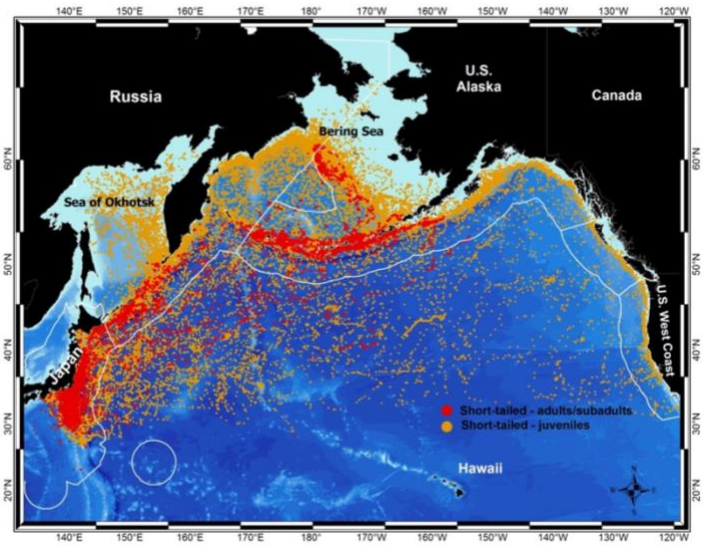
The U.S. has been actively involved in Short-tailed Albatross (*Phoebastria albatrus*; STAL) conservation for the past 20 years following bycatch mortalities of STAL in Alaskan longline fisheries. Conservation

efforts have been multifaceted and their success attributed to partnerships among key individuals within agencies, industries, and institutions. International collaborations have also been key given that STAL nest in Japan, but forage in marine waters of Pacific Rim countries. The U.S. Fish and Wildlife Service, which has management authority over STAL, the National Marine Fisheries Service who has management authority over fisheries, and the North Pacific Longline Association were actively engaged in finding collaborative solutions from the beginning. Furthermore, targeted research supported informed management decisions. Conservation efforts for STAL have highlighted many important lessons, including: 1) the value of informed adaptive management strategies; 2) fishery and region specific solutions; 3) strong support from industry and the public; 4) collection and analysis of fisheries observer data; 5) sustained outreach and two-way communication with industry stakeholders. Examples of adaptive management strategies include relaxation of deterrent regulations in areas where research and industry feedback indicated albatross-fishery interactions were extremely low or non-existent. Fishery specific solutions were required when a small modification of fishing gear for local conditions reduced the effectiveness of seabird bycatch deterrents. Analysis of 23 years of fishery observer data in Alaska demonstrated remarkable success of seabird deterrents in reducing seabird bycatch, but also a concerning trend of increasing albatross bycatch over the past decade. Thanks to collaborative international conservation efforts, STAL are anticipated to reach two of the four endangered species delisting criteria by 2019. Although the STAL population is still < 1% of its historical size, the continued population increase and favorable indications of breeding range expansion are strong indicators that this species is on the road to recovery.



Locations of 99 adult/subadult vs. juvenile short-tailed albatrosses tracked between 2002-2014. Suryan et al. 2006, 2007, 2008, Suryan & Fischer 2010, Deguchi et al. 2014, Suryan & Kuletz 2018, Orben et al. 2018.

Strategic Initiative 3: Strengthen Key Partnerships

Past partnerships and future collaborations between USFWS and NOAA Fisheries

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Roberta Swift is the Seabird Coordinator for the U.S. Fish and Wildlife Service Office of Migratory Birds which includes Oregon, Washington, Idaho, Hawaii and the U.S. Tropical Pacific. She provided an overview of the structure of USFWS and their partnership with NOAA fisheries. The U.S. Fish and Wildlife Service (USFWS) is divided into eight regions, and at this meeting three staff from Migratory Birds represented Alaska, the West Coast Regions, and the East Coast Regions. She specifically described the mission of her division, the Office of Migratory Birds, which focuses on conservation and management of non-listed bird species, through both regulatory and non-regulatory pathways. The Office of Migratory Birds has worked with NOAA on a variety of issues including Memorandum of Understanding (MOU) development, Agreement on the Conservation of Albatrosses and Petrels (ACAP), and the National Plan of Action (NPOA), as well as technical support on a number of other projects and issues. USFWS divisions, their focus, priorities and missions were reviewed. The structure of the USFWS at different levels dictates communication pathways, within and without the agency, and should be considered. Each Division generally communicates directly to outside agencies rather than through a common point of contact. For instance, refuges along the West Coast and the U.S. Tropical Pacific traditionally have communicated directly with NOAA on projects and issues related to Marine National Sanctuaries and Marine National Monuments. Projects currently being conducted cooperatively between USFWS divisions such as the Albatross Demography Project will provide data to advise NOAA on fisheries and seabird management issues. A new program, which will be a useful conduit between NOAA and the USFWS for seabird monitoring programs and data is the USFWS Pacific Seabird Inventory & Monitoring Program (PSP). Ideas for future collaboration include working together to make at-sea seabird data accessible for project planning and assessments, potentially through the USFWS Information, Planning, and Consultation System (IPAC) system.

Eastern Seabird Topics

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No abstract.

U.S. Fish and Wildlife Service Region 7- Alaska Migratory Bird Management Seabird Program

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The U.S. Fish and Wildlife Service Region 7 Migratory Bird Management Seabird Program (MBM) focuses on conservation topics that impact seabirds in the state of Alaska. We work on seabird issues pertaining to habitat conservation, abundance and distribution, and threats to seabird population. These issues include: seabird bycatch, oil spills, subsistence harvest, coastal/offshore development, seabird mortality events, and emerging changes in the Arctic. Seabird colony monitoring is accomplished in collaboration with the Alaska Maritime Refuge to study seabird productivity, nesting chronology and diets at 10-15 major colony sites on a rotating 1-3 year basis across the state. In addition, we have an ongoing at-sea monitoring program that conducts seabird surveys in coastal and offshore waters in Alaska. MBM has been conducting bi-annual coastal seabird surveys in Prince William Sound since 1989 to monitor the recovery of seabird species impacted by the Exxon Valdez Oil Spill, along with occasional coastal surveys

in Kachemak Bay. Annual offshore seabird surveys are conducted to provide information on seabird distribution, abundance, and marine habitat in the Gulf of Alaska, Bering Sea and Chukchi Sea. Since the start of the offshore monitoring program in 2006 we have conducted over 130,000 km of surveys across Alaska. Surveys are funded via a grant, and interagency agreement with the North Pacific Research board and the Bureau of Ocean Energy Development. These surveys are accomplished by partnering with ongoing multidisciplinary large vessel based research projects headed by National Oceanic and Atmospheric Administration, National Science Foundation, Woods Hole Institute, University of Alaska Fairbanks, and other institutions. Data gathered during these studies provides information that is used to examine current and long-term changes in seabird distribution and community composition in the north Pacific and helps supports informed management decisions in Alaska.

Seabird Coordination at FWS, Ecological Services

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The Ecological Services Division of the U.S. Fish and Wildlife Service (USFWS) is responsible for administering the Endangered Species Act (ESA) for species under FWS jurisdiction, including completion of consultation under section 7(a)(2). Although NOAA Fisheries has similar responsibilities for marine species, they consult with USFWS for species that may be affected by their activities. The short-tailed albatross (*Phoebastria albatrus*) has become more common on the U.S. West Coast, and after an individual was killed in the sablefish fishery in 2011 off the Oregon Coast, consultation has been completed for many of the permitted fishing activities and research activities conducted by NOAA Fisheries. NOAA Fisheries and USFWS have worked collaboratively to establish procedures for estimating take and engaging stakeholders in the consultation process. Two biological opinions, one tiered opinion, and two informal consultations have been completed in the last three years, establishing some conservation measures to minimize take of seabirds. The solid working relationship between USFWS and NOAA Fisheries has been instrumental in completing timely consultation, developing sound conservation actions based on science, and fostering collaborative efforts to address seabird bycatch with the commercial fishing industry.

BOEM's Data Needs to Assess Potential Effects of Offshore Energy Development on Seabirds

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The mission of the Bureau of Ocean Energy Management (BOEM) is to manage development of the United States' offshore energy and mineral resources in an environmentally and economically responsible way. In addition to regulating offshore oil and gas production in federal waters, BOEM has discretionary authority to issue leases, easements, or rights-of-way for renewable energy activities, including wind, wave, and ocean current on the Outer Continental Shelf (OCS). These authorities require assessments of the potential environmental impacts to resources on the OCS. BOEM conducts studies and research through its Environmental Studies Program (ESP). Through the ESP, BOEM collects environmental information to provide the scientific basis for evaluating potential impacts to the environment from regulated activities. These studies are designed to provide an improved understanding of the ecosystem, a baseline for assessing cumulative effects, and the scientific basis for developing regulatory measures to mitigate adverse impacts. With broad-scale assessment of suitable areas for energy production offshore, the challenge has been to collect and compile information quickly and at as large a scale as possible. Assessing what we know, what we can predict, and how we can assess risk has led BOEM to develop and collaborate on a variety of studies, including baseline data

assessments, at-sea surveys, tracking studies of seabirds and shorebirds, predictive modeling of seabird distribution and abundance, vulnerability and risk assessments, and technology testing for efficient ways to inventory birds on the OCS. Collaborations with NOAA have included support of Marine Assessment Program for Protected Species (MAPPS) projects in several regions, marine biogeographic assessments, and data synthesis and predictive modeling projects. The results are being applied on the OCS to provide for assessments of potential effects and data needs at regional and local scales with the goal of designing and implementing projects that will minimize effects to avian species to the greatest extent practicable.

Regional Fisheries Management Organizations, Bilateral Fisheries Dialogs, and Global Fora

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NOAA Fisheries engages in international partnerships to promote sustainable management of ecosystems and populations of seabirds and other marine living resources that the United States shares with other nations. Several offices within NOAA Fisheries work internationally, in coordination with other agencies and stakeholders, on a range of activities, such as direct capacity building and training, bilateral engagements with our counterparts in other countries, and multilateral negotiations in regional fisheries management organizations and global fora like the United Nations. The United States is party to several regional fisheries management organizations (RFMOs). In those fora, NOAA Fisheries works within the U.S. delegation to advance measures that serve to manage seabird bycatch, such as seeking to obtain quality data from observers, higher levels of observer coverage, effective evaluation of compliance with binding measures, and mitigation of seabird bycatch. Through bilateral relationships with counterparts in other countries, a wide range of issues are discussed one-on-one, providing an opportunity for collaboration and building alliances. In global fora, NOAA Fisheries in coordination with other agencies promotes practices to manage seabird bycatch. For example, at the Food and Agriculture Organization of the United Nations (FAO), the United States contributed to the development of *International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries* and the 2009 best practice technical guidelines related to NPOA-Seabirds development. The United States has been participating as an observer and as invited experts in the meetings of the Agreement on the Conservation of Albatrosses and Petrels (ACAP) since the agreement went into effect, contributing to ACAP's objective through the habitat improvement work done on U.S. breeding sites of albatrosses and petrels and through the seabird bycatch monitoring and mitigation work, as well as direct involvement in the work program of ACAP.

North Pacific Regional Fishery Management Council

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No abstract.

Management of Seabird Fishery Interactions by the Western Pacific Regional Fishery Management Council

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The Western Pacific Regional Fishery Management Council (WPRFMC), in working with the Hawaii longline industry and NOAA Fisheries, led the development and implementation of seabird mitigation

measures in the Western Pacific region in the late 1990s and early 2000s. Fishery interactions with Black-footed Albatross (*Phoebastria nigripes*) and Laysan Albatross (*Phoebastria immutabilis*) were significantly reduced as a result of these efforts. Since 2015, WPRFMC has used the annual Stock Assessment and Fishery Evaluation (SAFE) report review process to monitor the status of seabirds and other protected species interactions and to identify data, assessment and management needs to inform the Council's fishery management process under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). WPRFMC convened a workshop in November 2017 to improve the understanding of environmental and operational factors influencing interaction patterns and population-level impacts of higher interactions observed in the Hawaii longline fishery since 2015. The workshop findings indicated that 1) the increase in interactions may be driven by environmental factors such as wind and Pacific Decadal Oscillation (PDO), and 2) higher level of interactions are likely to have imperceptible difference on Black-footed Albatross population growth, unless the increase applies to all North Pacific longline fisheries. The workshop identified additional data gaps and research needs. Existing mechanisms and processes through MSA and the Fishery Management Councils provide an effective platform for addressing seabird bycatch issues, identifying research and assessment priorities and engaging industry. For example, WPRFMC sets management and research priorities through a number of planning and priority documents including its Program Plan, MSA 5-year Research Priorities, and Cooperative Research Priorities. These documents include priorities for addressing seabird interactions in fisheries managed under the Fishery Ecosystem Plans. WPRFMC's seabird priorities for the next five years include 1) addressing data, research and assessment needs identified through the annual SAFE report recommendations; 2) improving understanding of ecosystem factors driving seabird interaction rates and patterns; 3) convening a workshop to review seabird mitigation requirements in the Hawaii longline fishery (Sept 18-19, 2018); 4) testing alternative mitigation measures; and 5) streamlining handling guidelines and requirements for various protected species.

Stellwagen Bank National Marine Sanctuary Report: Great shearwaters (*Ardenna gravis*) - Movements, habitat use and human interactions

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Stellwagen Bank National Marine Sanctuary (SBNMS) is located off the coast of Massachusetts between Boston and Cape Cod. SBNMS is part of our National Marine Sanctuary system (ONMS) within the National Ocean Service (NOS) part of the US Dept. of Commerce. We have been studying great shearwaters since 2013 using platform terminal transmitter (PTT) tags along with other data collected when the birds are handled. These shearwaters are the most abundant seabird in the Gulf of Maine during summer and fall months and are mostly nonbreeding birds. The study is collaborative and involves several academic, government and non-government groups that together are producing results that document the movements and habitats used by these shearwaters while in the Gulf of Maine. Two principal scientific papers have been published to date. Great shearwaters also constitute the largest seabird bycatch by commercial marine fisheries in the Northeast and Mid-Atlantic US. They are caught primarily while gillnetting for spiny dogfish (*Squalus acanthias*) in an area most frequently used by the birds east of Chatham on Cape Cod. We are making collaborative efforts with the fishermen to reduce their bycatch.

Leveraging limited resources: coordination and collaboration with NGO's, Universities, and Sea Grant

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The North Pacific Observer Program implemented seabird bycatch monitoring to groundfish observer duties in 1993. Alaska groundfish seabird bycatch monitoring tasks were developed based on earlier work completed in North Pacific drift gillnet fisheries in close collaboration with the U.S. Fish and Wildlife Service (USFWS). Program success over the past 25 years depended on continued work with the FWS and a variety of partners. To make the best use of limited staff and funding, and to maximize the management, scientific, and conservation value we get from the fisheries monitoring program, the AFSC depends on a suite of partners, collaborators, and contracted vendors. Observers of course are the key to this successful program. The University of Washington Coastal Observation and Seabird Survey Team currently provides excellent observer training for seabird responsibilities and tasks. Oikonos Ecosystem Knowledge acts as a vendor to complete necropsies of seabirds returned by observers. Supported by National Seabird Program and other leveraged funds, this program also provides support for the marine bird food habit program and together address several of the high priority tasks noted in the USFWS's Albatross Conservation Action Plan. A primary partner of the AFSC and Alaska Regional Office has been the Washington Sea Grant program which employed the collaborative method with industry and others to develop effective mitigation measures for the Alaska demersal groundfish fleet and other ongoing studies. Most work is reported through and/or approved by the North Pacific Fisheries Management Council. The takeaways from our experience are: (1) there is limited funding for seabird work, (2) offices can leverage funds by building on projects with additional support, (3) projects can leverage one another, (4) learning the federal small acquisitions rules is very important, and (5) the "Collaborative Method" has a very specific meaning (sometimes foreign to the federal work environment).

Strategic Initiative 4: Promote Seabird in Advancing Ecosystem-Based Fisheries Management

Ecosystem-based Fisheries Management, Integrated Ecosystem Assessments and Ocean Conditions

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No abstract.

Seabirds as indicators for ecosystem-based fisheries management in the North Pacific

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The North Pacific Fisheries Management Council manages federal fisheries off Alaska, setting quotas annually for large and economically valuable fisheries in the eastern Bering Sea, Gulf of Alaska, and Aleutian Islands ecosystem. NOAA provides scientific advice to the council to support the ecosystem-based fisheries management (EBFM). There are a variety of ways EBFM is practiced, such as by using climate-informed ecosystem models, optimum yield caps, protected species catch limits, and gear modifications. Ecosystem status reports (ESRs) are used to set ecosystem context for management decisions. The ESRs include ecosystem indicator-based ecosystem assessments, are targeted for fisheries managers, and linked with the annual stock assessment process. The ecosystem indicators represent a broad cross-section of the ecosystems, from oceanography to upper trophic organisms and fishing and human dimensions. Several seabird-based indicators are included in the ESRs, including

those based on seabird productivity, phenology, diets, bycatch, and mortality events. Groundfish stock assessments serve as the basis for quota discussions, but the seabird and other ecosystem indicators provide contextual information that is not included in the stock assessment models. One example of the impact of this contextual information on quota-setting is provided. In this case, the impact of the marine heatwave in the Gulf of Alaska during 2014-2016 supported the stock assessment finding that the Pacific cod stock had dropped 80%. Importantly, the information from the ESR provided explanation and mechanisms for the Pacific cod decline, which facilitated the acceptance of a radically-lowered quota. Seabird die-offs, poor productivity, and lack of forage fish in their diets were important components in the assessments of the ecosystem impacts of the heatwave.

Seabirds as indicators for ecosystem-based fisheries management in the Southern Ocean.

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The Convention on the Conservation of Antarctic Marine Living Resources specifies ecosystem considerations for the management of fisheries in the Southern Ocean. In particular, the objectives set out in the Convention seek the 'maintenance of the ecological relationships between harvested, dependent and related populations'. Toward this objective, a voluntary ecosystem monitoring program was established to facilitate standardized data collection from disparate research programs on several seabird species. The monitoring program was initially targeted to provide advice for the management of the Antarctic krill fishery. The seabird species (4 penguins, 1 albatross, and 2 petrels) were selected given their dependence on Antarctic krill. The suite of parameters to be monitored, which includes chick production, foraging trip durations, chick growth, annual survival, and breeding population size, were selected based on their likely sensitivity to changes in the state of krill populations. The monitoring program was thus clear in its identification of which species to monitor, what data to collect, and why such data could be useful. However, while the intervening years have witnessed an impressive accumulation of data from seabird monitoring sites scattered around Antarctica, agreement on how to use the data to advise fisheries management has been elusive. More traction has been gained in the realm of spatial planning, where identification of foraging habitats, movement corridors, and areas of concurrent spatial overlap with fishery operations have informed risk-assessment frameworks to advise on spatial allocation of catches to reduce localized risk to krill-dependent predators.

Seabird distribution, ecology, and relative abundance in the central and eastern Pacific based on at-sea surveys, 1988-2017

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This presentation provided an overview of ongoing research based on the NOAA Fisheries Southwest Fisheries Science Center's at-sea surveys in the central and eastern Pacific between 1988-2017. This seabird strip transect dataset encompasses 170,230 sightings of 431,691 individual seabirds from over 167 species and represents over 135,000 km^2 and 3299 sea days of survey effort. This globally unique data resource provides a wealth of information on seabird distribution, ecology, and relative abundance that can be used to inform ecosystem based management (EBM) and ecosystem base fisheries management (EBFM). Broadly this dataset is currently being applied in a variety of ways to improve to our knowledge of seabird biology including: 1) mapping seabird distribution patterns, 2) developing

estimates of seabird abundance and population trends, 3) informing species delineation and systematics, and 4) highlighting vulnerabilities to human stressors. Data on seabird distribution and abundance is also being used to better inform our understanding of marine ecosystems. Under the latter category projects include: 1) better understanding the climatic and oceanographic drivers of seabird-tuna-dolphin foraging aggregations, 2) developing fisheries-independent indices, and 3) evaluating ecosystem services. A potential future use of this dataset in EBM/EBFM might be the calculation of prey biomass requirements necessary to maintain breeding and non-breeding populations of seabirds in the California Current, which could potentially inform the management of forage fish and squid fisheries.

Strategic Initiative 5: Elevate Awareness of and Support for the National Seabird Program

Overview of tools to elevate awareness and support

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NOAA Fisheries' National Seabird Program (NSP) has used a number of tools in the past, and continues to do so in the present, to elevate awareness and support for the program. These tools fall into five general categories. (1) Annual NSP reports have been produced since 2016. These provide an overview of statutes and agency priorities guiding NSP activities, NSP collaborations and partnerships, and NSP overarching goals, as well as a detailed list of accomplishments associated with policy and management, research and fieldwork, presentations and meetings, publications, and outreach. (2) Briefings to NOAA Fisheries Leadership (e.g., the Assistant Administrator, the Science and Regulatory boards, the Protected Resources Board) are provided whenever opportunities arise, typically when a change in high-level leadership occurs, or when a significant meeting requires background information. (3) Presentations are given to NOAA Fisheries working groups which share goals and/or have overlapping activities with NSP. These include the Bycatch Reduction Engineering Program and the National Observer Program Advisory Team. (4) Presentations at professional scientific and management meetings on general activities pertaining to NSP or specific topics relevant to scientific themes or stakeholder interests have been effective communication and outreach tools. (5) The NSP maintains a website where general information, guiding documents, annual reports, abstracts from NSP-funded projects, and significant activities are posted. Future efforts to further awareness of and support for the NSP can build on these successes.

Appendix 5. Membership of the five Strategic Initiative Working Groups at the 2018 Meeting of NOAA Fisheries' National Seabird Program.

1. Monitor and Estimate Seabird Bycatch	
Lee Benaka (co-lead)	Jennifer Lee
Noelle Olson (co-lead)	Ryan Silva
Jason Jannot (co-lead)	Summer Martin
Joan Browder (via phone)	
2. Mitigate Bycatch	
Sarah Ellgen (co-lead, via webinar)	Anne Marie Eich (via phone)
Erin Wilkinson (co-lead)	Roberta Swift
Rob Suryan (co-lead)	Rachael Wadsworth
Asuka Ishizaki	
3. Strengthen Key Partnerships	
Lisa Ballance (co-lead)	David Pereksta
Mi Ae Kim (co-lead)	Jeff Shenot
Steve MacLean	Asuka Ishizaki
Scott Johnston	Laura Todd
Stacey Nathanson	Therese Conant
4. Promote Seabirds in Advancing Ecosystem-Based Fisheries Management & Ecosystem-Based Management	
Jefferson Hinke (co-lead)	Robert Pitman
Tom Good (co-lead)	Trevor Joyce
Stephani Zador (co-lead)	Mridula Srinivasan
Jen Zamon	Tammy Russell
Harvey Walsh	Kevin Powers
Liz Labunski	Laura Koehn
5. Elevate Awareness of and Support for the National Seabird Program	
Annette Henry (co-lead)	
Shannon Fitzgerald (co-lead)	
Therese Conant (co-lead)	